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ABSTRACT

There is over the last few years a clear trend in Europe to privatise traditional govemmental tasks, also because of new EU legislation. Many of these tasks have traditionally been carried out by the govemment itself, largely because of the 'natura1 monopoly' argument. Examples of current and future privatisation policies are the telecommunication and energy sector. For transport infrastructure (in this paper limited to roads and railways) however, the picture is less unambiguous, as in the past decade the govemments have even tended to increase their influence, e.g., by formally taking over the financing of infrastructure.

In this paper it is analyzed in how far the traditional arguments for govemment intervention are stil1 valid. First, the strategic importance of transport infrastructure is investigated by analyzing the resulting economic impacts at several spatial levels. Next, we investigate how this affects the financing and operation of transport infrastructure as a traditional govemment task, by applying inter alia the so-called Pentagon model and by employing the well-known Coase-theorem. In this context, the traditional arguments for govemment intervention and possibilities for private operation and financing of transport infrastructure are reviewed. It is concluded that the traditional arguments for government intervention have become less valid and that privatising transport infrastructure may improve the competitive position of countries or regions.

1 INTRODUCTION

The influence of public policy on the society and the regional and national economy has drastically increased since 1945. As a result govemment expenditures have significantly risen (absolutely and relatively), while also much more regulatory measures have been introduced. Social security systems were, for example, largely expanded, while the government assumed inter alia responsibility for the financing and operation of transport infrastructure (Nijkamp and Rienstra, 1993).

In the 1980s however, the societal and institutional environment in which economic agents were used to act changed dramatically (Fokkema and Nijkamp, 1994). This holds for the public as well as the private sector: the devolution movement has induced an increased competition between companies and countries. As a result, a rising need for restructuring and renewal has come to the fore, and hence the Schumpeterian paradigm of 'creative destruction' has gained popularity. Even large companies like IBM and Philips appear to face problems when lags in renewal cause structural inefficiencies. The same may hold for countries: the economic development of most Western-European countries for example lags behind that of the US and the Pacific, which may be due to a more regulatory and conservative institutional environment in Europe.

The response of successful companies to this challenge has been diverse:

an increasing emphasis on scaling up by fusions and take-overs (e.g., in the financial sector);

an aggressive market penetration (e.g., consumer electronics);

'back to basics' strategies with repulsion of other activities (e.g., car industry, micro-electronics);

emphasis on quality and flexibility (just in time principles, temporary contracts for employees);

developing national and intemational strategic alliances, in order to secure the competitive position (car industry, chemical sector).

These trends are not only found in the private, but also in the public sector. As a result much more cooperation between countries seems to occur (EU, NAFTA, ASEAN), several activities are repulsed (transport, telecommunication), while unnecessary regulations are abolished (labour market, capital market). It may be clear that a good management in the public as well as the private sector may be of increasing importance for the economic development and welfare of countries, regions and their citizens.

Als0 in the transport sector - which is traditionally very much a regulated sector - many changes occur nowadays. Traditionally , natura1 public monopolies were thought to be the best market organisation. Nowadays, it is widely acknowledged that incentives should be introduced to make this sector more efficient (see also Button and Pitfield, 1991).

In the 1980s the investments in infrastructure in many EU countries decreased largely , because of public budget problems and an increasing attention for environmental impacts of transport (Bruinsma, 1994). The past few years the attention for transport infrastructure has again increased, which may be a result of the increasing congestion, while the attention for Trans-European Networks has emerged because of the integration of the European Market (Nijkamp et al., 1994).

As a result it may be interesting to analyze in how far the above discussed developments may influence the management of transport infrastructure and whether it is possible to increase the influence of private parties in this sector. We will restrict ourselves to road and rail infrastructure, although the arguments may also hold for other kinds of infrastructure (harbour, airports, telecommunication etc.).

The paper is built up as follows. First, in Section 2 the strategic importance is discussed by assessing the economic impacts of transport infrastructure and identifying trends in the use of governmental policy instruments. In Section 3 the traditional arguments for govemment influence are discussed. Next, Section 4 focuses on problems related to private financing and operation of infrastructure by analyzing transport infrastructure from the viewpoint of a 'normal' economic good. In Section 5 we investigate how private infrastructure provision may in practice be analyzed. Finally, some conclusions are drawn in Section 6.

2 THE STRATEGIC IMFORTANCE OF TRANSPORT INF'RASTRUCTURE

2.1 Introduction

There is an increasing attention for transport infrastructure as a vehicle for stimulating economic growth and improving the competitiveness of countries or regions. It is questionable whether such presuppositions are valid, however, as there may be contrasting developments. For example, interregional trade theory claims that the construction of infrastructure has a clear positive impact at several spatial scale levels (Bruinsma, 1994). Several costs for economic firms are reduced, because travel times are lower and become more reliable (which

makes e.g. just-in-time delivery possible). Therefore, production factors may be used more effkiently, which improves the competitiveness of companies. In this way the construction of infrastructure may have a positive impact on a national or regional economy. On the other hand, it is well possible that the improved accessibility will increase the competition from other regions or countries, which may then hamper the expected economic growth.

The final result is unclear and therefore empirical research should offer more insight into such impacts. To analyze this question, we will first present a concise overview of some case studies on the national, regional and urban level.

2.2 Empirical research

At the national leve1 several studies have been carried out on the impacts of public investments in genera1 and of those in transport infrastructure in particular (see e.g., Aschauer, 1993; Bruinsma and Rietveld, 1993; Seitz, 1993). It appears that investments in several kinds of infrastructure - especially roads - contribute largely to economic growth. This occurs by means of increasing sales of private companies; the impact on employment may be smaller however, since the productivity of labour also increases.

An important question in this respect is whether these impacts are temporary or permanent. In the first place, construction of infrastructure only stimulates economic growth because of the multiplier effects of the construction activities themselves. When the project is finished, the impacts are fading away . Secondly , better infrastructure and accessibility improve productivity , which will stimulate economic growth. As observed by Bruinsma (1994), some studies make such a distinction between these impacts, but others don't.

Transport infrastructure may not only be important for national, but also for regional economic development. In empirical research positive economic impacts are often found, especially on employment, the leve1 of investments and regional economic growth (see for an overview Bruinsma and Rietveld, 1993). Other studies however, do not fmd significant impacts (see e.g., Rienstra et al., 1994).

An important analytical distinction to be made is between generative and distributive impacts. In the first case there is clearly additional economic growth resulting from the construction of infrastructure, in the second case there is only a shift of economic activities, while at a macro-leve1 there is no impact at all. It appears often to be difficult to disentangle these impacts, because all may occur at the same time.

2.3 The increasing importance of infrastructure

It may be clear that - especially at the national leve1 - generative impacts occur, which emphasize the importance of transport infrastructure of a high quality. This importance is reinforced by some genera1 trends at the European and global level.

First, because of the integration of e.g. the European markets and the liberalisation of global capita1 markets, the attention for the competitive position of distinct countries has increased. At the same time the possibilities for governments to influence this position have decreased, since the traditional policy instruments - adaptations of the exchange rate, monetary and budgetary policies - cannot be used because of the EMU-conditions and the liberalisation of capita1 markets. Therefore, the construction of infrastructure (not only transport, but also e . g . telecommunication) is one of the few policy fields left in order to influence the competitive position of a country. As a result, many countries compete with another to a larger extent, by improving the business climate via tax cuts, subsidies and offering (semi-)public facilities.

Second, there appears to be an increasing competition of 'low wage countries'. Next to the competition of Pacific countries, the competition of Eastern-European and North-African countries has dramatically increased. Therefore, labour intensive production may be repulsed to these countries. The only way for high wage Western-European countries to curb this trend is to offer products and services with a high quality and productivity. This increases the need for R & D and a high education level, but also for high quality infrastructure.

As a result there is not only an increasing emphasis on the quantity of infrastructure, but also its quality . Examples are the 'digital highway' , the introduction of mobile telephone networks, the construction of a HST network etc.

2.4 Success factors influencing infrastructure

The quality of infrastructure may be analyzed by using the so-called Pentagon model, which contains the five critical success factors which contribute to the efficiency of an infrastructure network (see also Nijkamp et al., 1994).

The hardware aims at the physical features of the infrastructure (terminals, roads, railways, harbours). Software focuses on the control of it, for example by introducing telematics systems to provide information to users. There is a danger that most attention will be paid to the hardware and software, while other strategic factors may be largely forgotten. The model emphasizes however, that als0 a variety of other factors are of major importance for imposing the economic structure, welfare and well-being of countries and people.

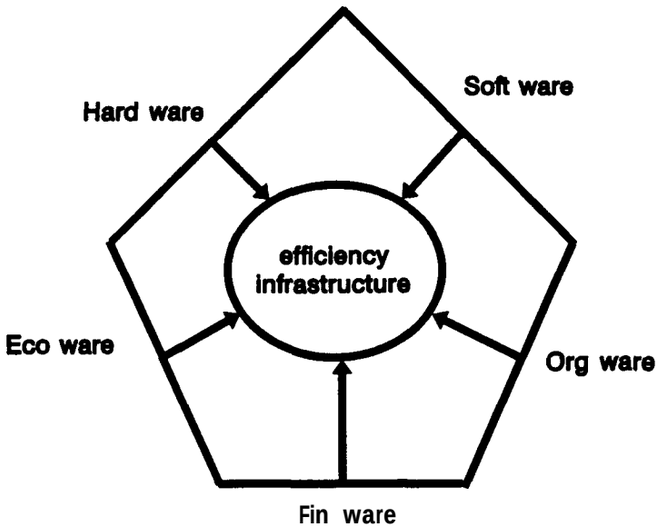

Figure 1 The Pentagon model

As a result also the orgware - the organisation and management - is of major importance for the efficiency of a country or region. However, the construction and use of infrastructure causes many - especially negative - extemalities, like noise, stench and visual annoyance or local and global air pollution. The government and society have to make a trade-off therefore, in which these negative externalities are weighed against the positive economic impacts (ecoware). It may be clear however, that a private delivery of physical transport infrastructure may cause more problems than that of e.g. ,telecommunication.

Finally, the way new infrastructure is financed (fmware) is also an important success factor, which may be done entirely public, entirely private or by both sectors (joint venture). In the next sections we will analyze some strategic policy factors which influence the orgware and fmware of transport infrastructure, especially when new infrastructure projects are introduced. We will pay particular attention to possibilities for improving the overall effkiency by increasing private sector involvement in the organisation and financing of the infrastructure.

3 GOVERNMENT INTERVENTION

3.1 Introduction

It is clear that there is - and should be - a large difference in the financial and socio-economie targets and democratic responsibilities of the private and public sector. As a result there are several reasons for the govemment to intervene in the economy and to assume responsibility for the provision of several goods. It may be clear that pure collective goods (like defence) are normally an exclusive govemmental responsibility. When the use of a good is competitive however (as is the case with infrastructure), this good may in principle be provided by the private sector as well.

The question in how far goods should be provided by the private sector may be analyzed by using the transaction costs approach. Transaction costs include those of e.g. negotiating, making contracts, control and requiring information. Within the Coase-theorem of a world without transaction costs there is no efficiency difference between provision by either the public or the private sector, because negotiations continue until there is a Pareto-optimal allocation of goods (Coase, 1988).

In reality however, there are of course many kinds of transaction costs. A good should now be provided by that sector, which can offer it against the lowest transaction costs. For normal goods, provision by the private sector will be optimal. For some goods however, this may not be the case, which may justify public intervention. In this respect it should be acknowledged, that also intervention causes costs - leading to so-called govemment failures -, which should be weight against the resulting benefits.

In order to analyze how far govemment intervention is desired (in order to correct a biased market allocation), we will first present a concise overview of arguments to intervene, while next the concept of govemment failures will be elaborated.

3.2 Validity of traditional intervention arguments

There are several standard reasons for govemments to intervene in the market. In light of the above mentioned trends in society, it is questionable however, whether these arguments are still valid (Fokkema and Nijkamp, 1994; Nijkamp and Rienstra, 1995).

First, there is the 'infant industry' and 'infant region' argument. Here it is argued that in an initial stage of industrial or regional development the economic basis of a sector or region is too weak to be competitive and to

survive, and therefore economic actors should be protected temporarily. In practice however, it appears that these measures are very hard to abolish, while these may lead to inefficiency and a Pareto-suboptimal allocation. Therefore, there is nowadays more a trend to establish an attractive general business climate, while - at least in Europe - protection also is decreased by European legislation. Another argument is that in recent decades the accessibility of peripheral regions has increased substantially by constructing new infrastructure (Rienstra et al., 1994), which reduces the validity of the infant region argument.

Second, market failures may occur because a market system does not always result in a Pareto-optimal allocation. The aim of govemment intervention is then to remedy this sub-optimal allocation and in this way to move towards the theoretically optimal situation of perfect competition. There are several causes of such market failures.

imperfect competition; infrastructure is an example of this situation, because it is in most cases not efficient to operate two links on the same corridor. Also the special network character of infrastructure causes imperfect competition: one given link may contribute to the profitability of other links, and therefore an unprofitable link may be profitable when the impact on the total network is taken into account. Often however, there is competition with other modes (while for highways also a high quality underlying road network is available), which reduces the importance of this argument.

imperfect information; this seems (besides telematics systems) to be of lesser importance in the case of infrastructure.

absence of markets: govemments intervene in transport to eliminate negative extemalities or to generate positive extemalities as discussed above. In environmental and transport policy however, there is a trend to cope with negative extemalities in a more market based way, e.g., by increasing fuel costs and introducing tolls or road-pricing systems. Such measures might also be carried out by private instead of public companies however, since there is in principle a direct user charge for the operator of the infrastructure.

Finally, there is the ethics and justice argument; an obvious example is the provision of non-profitable public transport, because the government wants to provide a minimum mobility leve1 for everyone at reasonable fares. In this respect, there is again a clear trend towards a market based provision, by using franchising contracts in order to link social policies to efficiency incentives (see Section 5.2).

It may be concluded that the necessity for govemments to intervene has been reduced. As mentioned above, there is at the same time a growing awareness of government failures, which will be reviewed next.

3.3 Government failures

When the govemment intervenes in the market, the market mechanism will (partly) be replaced by a budget mechanism, which has its own rules. These may lead to a suboptimal (i.e., too high) level of intervention, because of two important reasons (Frey, 1983):

- civil servants have their own goals and utility functions;
- decision-making is influenced by lobby and pressure groups.

These two arguments will now briefly be discussed. Civil servants may have a utility function, which differs from the societal one; this may lead to a suboptimal allocation of funds. An example is the budget maximisation theory, which takes for granted that the utility function of civil servants correlates positively with the public budget he has at his disposal. Since the civil servant has a monopoly position in the provision of information to the parliament, he will supply information with the intention that the intervention leve1 is higher than in the societal optimal situation. See for a graphical presentation Figure 2, in which a simple situation is presented with linear curves and without fixed costs. In this figure the leve1 of intervention corresponds with the budget of the civil servant.

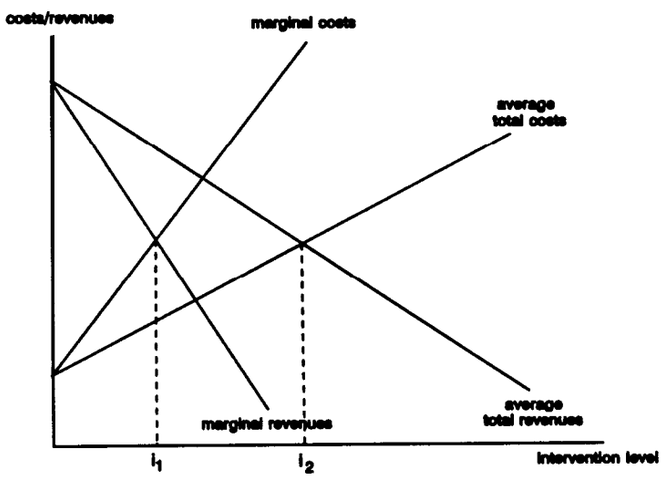

Figure 2 The intervention level under a budget maximising civil servant

When the parliament would have full information, it would choose the intervention leve1 at which the marginal costs would equal the marginal revenues, which corresponds with an intervention leve1 of i,, which is optimal. A civil servant however, may provide only information about the total costs, and as a result the parliament may decide to intervene at (somewhat left of) the point where the average total costs equal the average total revenues, which corresponds with intervention leve1 i_2. This is optimal for the civil servant since it maximises his budget, but it is suboptimal from a societal point of view.

Also pressure groups may increase the leve1 of intervention. Groups in society differ in power and strength: labour unions and employer organisations for example are well organized, while consumers and tax payers do not have powerful pressure groups. By negotiating , the most powerful groups may gain advantages at the expense of the less powerful ones. For each intervention measure the costs per individual (consumer, tax payer) may be so low and unclear, that it is not rational to resist the measure (like minimum prices, protection measures etc.).

Disadvantages of intervention in genera1 are that the market allocation is disturbed, while a non-transparent and complicated legislation may be introduced, which may affect the possible allocation gains of public intervention. As a result the management of infrastructure by the public sector leads by definition to efficiency losses. For transport infrastructure this may have three major impacts:

- the price asked for using the infrastructure may be too low, e.g., to satisfy car users (which is a powerful pressure group) and to maximise subsidies (budgets);
  inefficiencies in construction and maintenance of the infrastructure may emerge, because of lack of market incentives;
- construction of (unprofitable) infrastructure may take place, in order to satisfy pressure groups and to maximise budgets.

It is clear that a trade-off has to be made between the costs of govemment intervention and the benefits because of the improved allocation, or - in Coasean terms - between the transaction costs of market and public allocative regimes.

When the government decides to intervene, this should be done in the most efficient way . It may be clear that in many cases market-based intervention - in which the private sector takes care of the provision - may lead to lower transaction costs than in case of public provision; in this context, it should be acknowledged that also equity considerations are important, however.

In order to analyze the extent to which private provision of infrastructure is possible, we will in the next section discuss infrastructure from a viewpoint of a private investor .

4 INFRASTRUCTURE AS A PRIVATEGOOD

4.1 Introduction

In the development and construction of infrastructure four stages may be distinguished, which are important for investors. The first is the R & D-stage, in which the idea and the technical features of a project are developed. This stage is followed by the financing stage in which financiers become interested, while also the profitability of the project should be analyzed. The next stages are the construction and exploitation stage.

The R & D-stage is mainly a technical one, in which the infrastructure is developed, investigated and tested. It is important however, that also economic factors like the market potential will be considered. A political decision has to be made about the introduction as well. The outcome of this stage is supposed to be a given fact in the remaining part of this section. Most attention will be paid to the financing stage, because this is the stage in which economic possibilities have to be analyzed.

4.2 The financing stage

Four important issues may be important in the financing stage, which may to a large extent influence the possibilities of a market provision; in principle these may hold for all investments. These are the characteristics of investments in infrastructure, the risks involved, the expected costs and the expected revenues of the project.

Characteristics of investments in infrastructure

Most investment costs of a project are normally made when the infrastructure is constructed; the other costs (e.g., rolling stock) form a smaller part of the total costs. According to Emanuel (1991) the costs of a newly realised project consist for about 80% of construction costs. For society, the infrastructure costs are even more important, because the extemal costs of the construction and the operation are mainly discussed during the decision procedures about the construction and site of the infrastructure.

Investments in infrastructure may differ from competing investments such as immovables and capital goods in several ways (Nijkamp and Rienstra, 1995). Especially the high investment costs and the long construction and planning periods may make an investment very unattractive for a private investor, because in the beginning of a project a lot of capita1 is needed while the pay-back period is very long. As a result the interest costs are very high at the beginning of a project, while the cash-flow and the return on investments are low. In most cases there are no revenues at all before the operation starts. When it starts, the profits tend to increase over time, because more repayments are made, which reduce the interest costs. The problem is that these high profits and revenues often start decades after the initial investment, which make the uncertainty and the risks of infrastructure projects very high.

In practice however, it is very well possible that there is no profit at all (Nijkamp and Rienstra, 1995). The construction costs of infrastructure are (up to a certain level of demand/transport) fixed costs; the other costs are partly fixed and partly variable. From this it follows that compared to competing investments fixed costs in infrastructure are very high for an investor, while variable and marginal costs are relatively low. When the price in this case is set according to the marginal costs, it is often not possible to make a satisfactory return on investments.

An important factor is also the planning procedure. Often first a politica1 decision is taken in which private financing is already assumed, and next a private investor has to be found. This gives private investors a competitive advantage in negotiations with public agencies.

Risks of investments in infrastructure

Risks are included in all kinds of investments, but for investments in infrastructure these are particularly high. This is the result of the long pay-back period, which makes it difficult to make good estimations.

The political risks are the most important difference compared to alternative investments, however (see also Section 4.4). In practice, govemments always wish to influence the planning of infrastructure, because of the important positive and negative extemal effects and the national importance of high quality infrastructure (see Section 2). There is always als0 a danger of changes in laws or new regulations or even nationalisation, since a change in transport policy may influence the charges which can be asked as well as the competition by other modes.

In conclusion, the risks of infrastructure investments are very high compared to altemative investment opportunities; this in turn makes these investments unattractive for private investors, therefore a high risk compensation is needed. In theory, this compensation should be given on the basis of high profit expectations, as can also be shown from recent tunnel projects in the Netherlands. Another possibility however, is that the govemment guarantees (part of) the revenues in one way or another, or makes the investment attractive in a different way (e . g . , tax exemption).

The expected investment costs

The expected costs and revenues are of course important for the calculation of the return on investments. It appears to be very difficult to estimate the costs of construction of major infrastructure projects, however. These projects are often much more expensive than estimated beforehand; well-known examples are the Channel tunnel, High Speed Train-sections and the Betuwe freight railway line in the Netherlands. This problem arises especially when the project is a completely new transport mode or when new technologies are used. Then many costs are not known at the outset of the project and the estimates appear to be too low in almost all cases (Rienstra et al., 1995).

Another important cause of rising costs are relatively expensive solutions, chosen to cope with resistance in society, e.g., to avoid extemal effects (this may lead e.g., to (half-)subterranean infrastructure and noise-shields). It is however very important that the cost estimates are made on a reliable basis; otherwise it will be impossible to assess the economic viability of the project. And if no return on investment can be calculated, private investors might withdraw.

The expected revenues

To calculate the possible revenues of a project several issues are noteworthy, which are mainly important for the transport mode(s) which use(s) the infrastructure at hand. First, an assessment of the market in which the mode will operate is important. Therefore, the (sub-)market(s) one is aiming at should be analyzed. These sub-markets can be distinguished according to the residential zones of clients, their destinations, the reasons for travelling etc. When, for instance, a project serves a mass transport mode, the price must be low, while the comfort, speed and service may be of lesser importance. When the project is aiming at the higher leve1 business-market, the speed, reliability , service and comfort are very important, while the price may be set somewhat higher. The latter is of course also dependent on the prices of competing modes.

Next, it is important to quantify the sub-markets the mode is aiming at. The altematives for the traveller must be analyzed in light of the criteria which determine the choice. When this is known the mode may be constructed and exploited in the most competitive way. It is also important to consider the changes that are expected in the sub-market(s) in the future. Several issues regarding future transportation use may be distinguished (Nijkamp et al., 1994):

- demographic factors; for example declining population density in urban areas, the age structure, migration, labour participation, decline in working hours etc. ;
- politica1 factors; for example, the European integration, the opening up of new markets in Eastem-Europe, the transport aim and environmental policy of the government and/or municipalities etc. ;
  socio-economie factors; for example, economic growth, growth of and changes in trade flows, spread of production, the development of trade blocks etc.;
- technical factors; for example, the emergence of new competing transport modes, improvements of existing modes and telecommunication etc.

When this is analyzed, the number of travellers can be estimated. In this case it is important to investigate the uncertainty about these estimates, especially because these have to be made for the long term. It is especially crucial to analyze in how far the demand depends on characteristics of the infrastructure (which may be influenced) and on extemal factors (which cannot be influenced). Next, the optimal price can be set, eventually there may be price differentiation in one way or another, to reach different submarkets.

For total revenues it may also be important to generate other revenues than those which are directly related to transportation. Catering on long-distance travelling and tax-free shopping at airports are well-known examples of indirect revenues. But there may also be other possibilities. For example, railway stations are popular sites for several companies like bookshops, snackbars, flower shops, travel agencies etc. Another possibility for generating revenues is a development based on the value of the locations around transport terminals, which may arise after the construction of e.g. a new railway station. The question here is of course whether it is possible for the investor to receive (part of) these revenues.

When all revenues are known, the expected revenues for the investor may be calculated for the long run.

4.3 The construction and exploitation stage

When the financiers of a project (private and/or public) are identified and the procedures are completed, the construction of the project can start. It is in this stage very important that the costs are kept under control, because this causes often a lot of problems (e.g., the Channel tunnel). It appears that often the costs of construction are higher than expected, or certain financial items have been neglected. It is also important that the construction contracts are clear about who pays for excess costs; this often leads to conflicts, which can also have economic implications (e . g . , delays, higher costs) .

Reducing annoyance to local people during the construction is essential, especially when the construction takes place in densely populated areas. When the annoyance is high, the resistance in society against the construction will be high, which may cause delays.

When the transport mode is relatively new, it will have to work hard to get its share of the transport market. In most cases new modes will have to fmd a new niche in the market fust, while later they may also start to compete with existing transport modes. A good marketing strategy is very important to get a profitable market share. It is common practice that ticket prices have to be relatively low at the beginning, in order to attract new travellers and to give users of alternative modes an incentive to shift. Later on the charge may be raised towards the economic (or social) optimal level.

4.4 Current trends and lessons from existing projects

Since 1945 almost all infrastructure has been financed and operated by govemments or by public organisations tied to the govemment. Especially in the case of railways, there is at present a trend to separate the financing and operation of infrastructure, as is the case in Sweden, Switzerland and the United Kingdom (Hannson and Nillson, 1991; Nash, 1993). In this model, the management and financing of infrastructure is the responsibility of the govemment, while the operation takes place on a private basis, where the operator imposes user charges. In this situation there may be several suppliers of transport services, which allows competition. This model corresponds to recent EU-regulations and is proposed or under discussion in several countries (Germany, Italy, Netherlands) .

Road (and waterway) infrastructure is mostly the responsibility of the public sector however, although there are in several countries discussions about introducing toll or road-pricing systems.

It is noteworthy that in recent years several projects have been financed and exploited (partly) privately (Nijkamp and Rienstra, 1993). This concerns car traffic projects, like toll roads (France, Italy) and several tunnels and bridges (e.g., the Mont Blanc tunnel, Dutch tunnels, the Dartford bridge), but also rail projects like the TGV-Sud-Est and the Channel tunnel. Public intervention in these projects is still relatively high, however. Even the Channel tunnel, which is said to be a private sector initiative, would not have been constructed without a significant indirect support of the govemments concemed (Marcou, 1993). Intercity rail traffic is in some countries profitable, and is therefore not subsidised by the govemment (UK, Sweden, Switzerland). Local and regional traffic are ahnost everywhere exploited at big losses. Regional rail traffic and public road transport are subsidized in most European countries, as is the case with local transport modes.

As discussed above, it is very important that traffic flows have a critical mass, and hence projects which reduce the importance of barriers (borders and natura1 barriers) are relatively often privately financed.

It should be added that in several cases the govemment appeared not always to be a reliable partner. This may be an important failure factor for future projects, since this increases perceived politica1 risks. Examples are interventions of the govemment after the success of the Mont-Blanc-tunnel and the Cofi-route. The govemment obliged here the investors to finance new infrastructure with the profits they had made out of these projects.

It may be concluded that there is a clear trend towards govemments stepping back and of an increasing influence of the private sector in the operation and financing of transport infrastructure.

5 PRIVATE PROVISION IN PRACTICE

5.1 General conditions

As discussed above there is a clear privatisation trend in society. The arguments for govemment intervention have become less important, while any case of public intervention is often done in a market-based way. Therefore, privatisation of infrastructure may be an interesting option.

One of the arguments against privatisation is that the govemment may attract loans at lower interest rates than the private sector; public financing and operation is cheaper because no risk premium is needed. There are however two reasons which may make this argument less valid.

First, this argument holds for all investments, so that - when argued consistently - the govemment should finance or guarantee all investments. The reason that this is not the case is - as a second argument - that the private sector may provide the infrastructure in a cheaper way, which may compensate the higher interest costs. It is questionable of course, whether this also holds for investments in transport infrastructure.

As argued in Nijkamp and Rienstra (1995), two conditions have to be met for private financing possibilities:

- the private investor should take the risks of the investment (at least to a large extent);
- user charges should be levied.

The fust condition is, for example, not met when the govemment provides guarantees for the pay-back of loans. When the govemment guarantees loans, it runs the risks instead of the private investor, while possible additional revenues are handed over to the private investor. In this way there are also less incentives to provide the infrastructure efficiently. In conclusion, such a model is not economicly feasible and is therefore in the long run unattractive for govemments.

Next, levying user charges, e.g. by introducing toll or road pricing, is also a necessary condition. An altemative is that the govemment compensates the investor from the public budget, e.g. by providing a revenue per passing car. In this case however, the govemment accepts long term obligations, while the private investor will ask a considerable risk premium. Therefore, the costs for the govemment will be much higher than with public financing, while the government stil1 pays for the project out of the public budget. From this argumentation, it may be concluded that private financing is only feasible when there are considerable revenues from user charges. Private operation and management is therefore a sine qua non for private financing, while this relationship does not hold in the opposite direction.

Private financing constructions, which do not meet the above mentioned conditions, are sometimes politically very attractive however, because the funding of the investment can be postponed, while the public control over the infrastructure is not reduced.

5.2 Cooperation between the public and private sector

It may be clear that in theory transport infrastructure may be provided by the private sector. In practice however, the influence of govemments tends to be high, not only because of the strategic importance and the specific characteristics

of infrastructure, but also because of various environmental and equity issues involved. As a result, private financing and operation is in practice faces many problems. Therefore, joint ventures may be an interesting option by combining the advantages of both regimes. In such joint undertakings the above mentioned conditions should of course be met, while market incentives should be introduced to a maximum extent in order to achieve an efficient management and to reduce the transaction costs of infrastructure provision.

In many cases private sector involvement tends to be introduced by franchising (Andersen, 1993; Nash, 1993). A franchise can be defmed as a contract between a transport authority (the franchiser) and a private company (the franchisee), by which the latter obtains the right to operate a transport system. Under a conventional franchise contract, the franchisee pays the franchiser for using his property rights. In the case of transport infrastructure, this situation may be reversed: the transport authority may compensate the private company for an expected operational deficit. These franchise contracts may be allocated by means of tendering. There may be two different kinds of contracts: a given transport system is transferred to the company which offers to operate it at the lowest costs or the contract is transferred to the company which offers the best transport system for a given budget. The following management constructions may be introduced (Gidman et al., 1995):

- affermage; the govemment controls the formal regulations, but contracts out the operation (as is the case in some countries for rail infrastructure);
  leasing the infrastructure; this may however not meet the above discussed conditions;
- build, own and operate (BOO); in this model the private investor gets the concession and will become the legal owner of the infrastructure;
- build, operate and transfer (BOT); this system is similar to BOO, but at the end of a prespecified period the right to operate the infrastructure is transferred to a public authority; this is the option which is most often used in practice (e.g.,Dartford bridge, Channel tunnel).

6 CONCLUSIONS

The trends towards liberalising European and global markets, as well as the reduced efficiency of traditional policy instruments have led to an increasing attention for transport infrastructure. In this respect it is important that not only the 'hardware' and 'software' are considered as direct and clear success factors,

but that also 'orgware', 'fmware' and to a lesser extent 'ecoware' are taken into account. It should be acknowledged that the latter three factors are also of critical importance for the economic structure, the welfare and well-being of countries, regions and their citizens.

In orgware, current trends indicate an increasing attention for market incentives, in order to improve the competitive position vis à vis other countries, while reasons for govemment intervention have become less valid. It is clear however, that infrastructure - and the transport sector - cannot be left entirely to the competence of the private sector, because of the large number of extemalities involved and because of equity reasons. Public intervention is therefore stil1 necessary, although a trade-off has to be made because of the high transaction costs of intervention (govemment failures). When the govemment decides to intervene, market-based measures may be most efficient, which may not hamper privatisation.

It is clear that privatising infrastructure - first in the operation (orgware), and second also in financing (fmware) - may lead to efficiency gains, while at the same time other policy objectives (environment, tax level, govemment deficits) may be served.

In practice however, there are several problems which call for a solution. For example, it is important that the costs of constructing and exploitation of infrastructure will be well estimated. In this respect, it is als0 important that the calculations are consistent and do not underestimate real costs, as is often the case. The same holds for the expected use of infrastructure, since this is often information which is not available for private investors. Besides direct revenues, the generation of indirect revenues might be important, in order to reach an acceptable return on investment.

To attract investors, the risks have to be reduced to a maximum extent, with taking into account the above discussed factors. These risks follow especially from the long pay-back period and the associated politica1 risks. Reducing these risks may be (partly) a task of the govemment, however, therefore joint ventures may be attractive too.

It may be concluded therefore, that several modes of privatising infrastructure may provoke various practica1 problems, but on the other hand a more intensive involvement of the private sector may be essential for the enhancing competitive position of countries, without having negative impacts on other relevant policy objectives.

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